



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,390	12/08/2003	Jeffrey D. Flammer	P03951	4528

28548	7590	10/03/2007
STONEMAN LAW OFFICES, LTD		
3113 NORTH 3RD STREET		
PHOENIX, AZ 85012		

EXAMINER
PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
2841	

MAIL DATE	DELIVERY MODE
10/03/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/731,390	<b>Applicant(s)</b> FLAMMER ET AL.	
	<b>Examiner</b> Ishwar (I. B.) Patel	<b>Art Unit</b> 2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on May 12, 2007 and July 24, 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-40 and 42-47 is/are pending in the application.
- 4a) Of the above claim(s) 8,9,14,15,18-39 and 47-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,10-13,16,17,40,42,43 and 46 is/are rejected.
- 7) ☒ Claim(s) 44 and 45 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of specie A1B1 in the reply filed on July 24, 2007 is acknowledged. The traversal is on the ground(s) that According to MPEP §803, "[i]f the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, **even though it includes claims to independent or distinct inventions** (Emphasis added)." Examining pending Claims 42-50 clearly would not be a serious burden on the examiner. First, Claim 42-45 depend either directly or indirectly from Claim 1. Second, Claims 47-50 comprise language that would not be a serious burden to search in addition to the other pending Claims.

This is not found persuasive because each of the species has different structural arrangement and a full search of all the species will be burdensome to the examiner.

Further, **the applicant has not identified the claims reading on the elected specie**. To speed up the prosecution, ***claims not reading the elected specie are withdrawn from consideration***. As a result, the following claims (claims 8, 9, 14, 15, and 47-50) are further withdrawn from consideration (claims 18-39 were already withdrawn).

**However, if a generic claim is allowed, the claims depending upon the allowable claims or otherwise require all the limitations of the allowable claims will be rejoined and examined for patentability.**

The requirement is still deemed proper and is therefore made FINAL.

***Claim Objections***

2. Claim 4 is objected to because of the following informalities:

Regarding claim 4, the recitation "wherein said structural weakness comprises selective absence of adhesive at such selected location between said at least one rigid layer and said at least one flexible layer" is unclear. Claim 4 depends upon claim 1. Claim 1 recites the structural weakness in the rigid layer. The structure of the "weakness comprises absence adhesive" is unclear.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. Claim 40 is rejected under 35 U.S.C. 112, 6th paragraph (often broadly referred to as means or step plus function language), as being unclear in reciting the invention in the "means for function language". The recitation "conversion means for converting portions of rigidity means into a flexible means for flexing portions of said conductor means; wherein said conversion means comprises structural weakness means for structurally weakening selected portions of said rigidity means; wherein said structural weakness means comprises at least one score that partially penetrates said rigidity means" is unclear. The "conversion means" and "structure weakness" both used in the same claim is confusing, as structural weakness is the conversion means. Also, "insulating means for electrically insulating conductive portions of the rigid-flex printed

circuit board" is confusing. As both the flexible layer and rigid layers are insulating.

The scope of a "means" limitation is defined as the corresponding structure or material set forth in the written description and equivalents thereof. The phrase "means for " or "step for " must not be modified by sufficient structure for achieving the specified function.

Also, no correlation is shown between the elements, insulating means, conducting means and the rigidity means in the claims making the structure unclear.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6, 7, 10, 11, 13, 16, 17, 40, 42, 43 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Takuji Okeyui (Japanese Patent Publication No. 2001-036246).

Regarding claims 1-4, 6, 7, 10, 11, 42, 43 and 46:

Takuji in figure in figure 1 and 2 discloses rigid-flex printed circuit board system comprising, in combination: at least one rigid layer (3,4); wherein said at least one rigid layer comprises: at least one top side (top side of the layer), and at least one bottom side (bottom side of the layer); at least one first flexible layer (7b, 8b) bonded to at least one first portion of said at least one top side; at least one second flexible layer (7a, 8a)

Art Unit: 2841

bonded to at least one second portion of said at least one bottom side; wherein said at least one rigid layer comprises at least one first structural weakness (opening / gap between the element 3 and 4) at at least one first selected location; wherein said at least one first structural weakness is structured and arranged to facilitate breaking said at least one rigid layer at such at least one first selected location into at least two rigid pieces to provide a at least one first flexible connection formed by said at least one first flexible layer between such rigid pieces [claim 1], wherein such first such structural weakness comprises at least one score (line on the top side where the element 3 is cut, not specifically labeled) that partially penetrates said at least one rigid layer [claim 2], wherein said at least one score penetrates about two-thirds of the total thickness (as the line cut the rigid layer, see figure) of said at least one rigid layer [claim 46]; wherein at least one top score on said at least one top side at such at least one first selected location (see figure 1 and 2), and at least one bottom score (line on the bottom side where the element 3 is cut, not specifically labeled) on said at least one bottom side at such at least one first elected location [claim 3], wherein said at least one first structural weakness comprises at least one gap (gap between element 3 and 4, see figure 3) at such at east one first selected location between said at least one rigid layer and said at least one first flexible layer[claim 4], wherein said at least one rigid layer comprises fiberglass (see abstract) [claim 10], wherein said at least one first flexible layer comprises polyimide (see abstract), [claim 11], wherein said at least one first flexible layer comprises at least one top outermost layer (see figure); and said at least one second flexible layer comprises at least one bottom outermost layer (see figure), [claim

Art Unit: 2841

42]; further comprising one breakaway portion (the portion between element 3 and 4, not explicitly shown in the figure), [claim 43]. Regarding recitation said at least one first structural weakness comprises at least one laser score, as recited in claim 6 and said at least one first structural weakness comprises at least one mechanical score, as recited in claim 7, these are process limitations in the product claims. Such a process limitation defines the claimed invention over the prior art to the degree that it defines the product itself. A process limitation cannot serve to patentably distinguish the product over the prior art, in the case that the product is same as, or obvious over the prior art. See Product-by-Process in MPEP § 2113 and 2173.05(p) and *In re Thorpe*, 777 F.2d 695, 227 USPQ 964, 966 (Fed. Cir. 1985). Takuji discloses the structure. Therefore, Takuji meets the limitations.

Regarding claims 13, 16 and 17:

Takuji in figure in figure 1 and 2 discloses rigid-flex printed circuit board system comprising, in combination: at least one substantially rigid layer (3,4); at least one substantially flexible layer (7b, 8b) bonded to at least one portion of said at least one substantially rigid layer; wherein said at least one substantially rigid layer comprises at least one structural weakness (opening / gap between 3 and 4) at at least one selected location to facilitate bending said at least one rigid layer at such at least one selected location to provide at least one flexible connection (see figure 1 and 2), [claim 13]; wherein said at least one structural weakness comprises at least one groove (opening / gap between 3 and 4, see figure 3), [claim 16]. Regarding the

Art Unit: 2841

recitation said at least one first structural weakness comprises at least one chemically milled groove, as recited in **claim 17**, it is a process limitation in the product claims.

Such a process limitation defines the claimed invention over the prior art to the degree that it defines the product itself. A process limitation cannot serve to patentably distinguish the product over the prior art, in the case that the product is same as, or obvious over the prior art. See Product-by-Process in MPEP § 2113 and 2173.05(p) and *In re Thorpe*, 777 F.2d 695, 227 USPQ 964, 966 (Fed. Cir. 1985). Takuji discloses the structure. Therefore, Takuji meets the limitation.

Regarding claim 40, as best understood by the examiner in view of the section 112 rejection, Takuji in figure in figure 1 and 2, discloses a rigid-flex printed circuit board system comprising, in combination: insulating means (7b, 8b) for electrically insulating conductive portions of the rigid-flex printed circuit board; conducting means (5b, 6b) for conducting electricity through portions of the rigid-flex printed circuit board; rigidity means (3,4) for providing rigidity to all portions of said conducting means; conversion means (opening / gap between 3 and 4) for converting portions of rigidity means into a flexible means for flexing portions of said conductor means; wherein said conversion means comprises structural weakness means (structural weakness as opening in the rigid layer) for structurally weakening selected portions of said rigidity means; wherein said structural weakness means (line on element 3 near the opening) comprises at least one score that partially penetrates said rigidity



means [claim 40].

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takuji Okeyui as applied to claim 1 above.

**Regarding claim 12,** Takuji discloses all the features of the claimed invention as applied to claim 1 above including said at least one first flexible layer comprises at least one substantially flexible insulating layer (7b, 8b), and at least one substantially flexible conductive layer (5b, 6b). Takuji does not disclose said at least one rigid layer comprises at least one conductive layer. However, Takuji in other embodiment of figure 5 and 6 disclose additional conductive layer on the rigid board, which will increase the wiring density of the board.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the board of Takuji with a conductive layer on the rigid layer, as taught by the Takuji in other embodiments, in order to increase the wiring density.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takuji as applied to claim 1 above, and further in view of Li (US Patent No. 5,998,738).

**Regarding claim 5**, Takuji discloses all the features of the claimed invention as applied to claim 1 above including one flexible layer and one rigid layer but does not disclose one adhesive to bond the flexible and rigid layer. However, bonding of flexible and rigid layer using an adhesive layer is old and known in the art. Further, the adhesive layer will be removed where the bonding is not required. Li in figure 3 discloses a rigid flex circuit board (part section) with a flexible layer (18) bonded to rigid layer (12 comprising element 14, 15, 16) with an adhesive (31, 32) in the bonding area. The adhesive is not provided where bonding is not required.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to an adhesive layer bonding the flexible and rigid layer with, no adhesive where the bonding is not required, as taught by Li, in order to a better bonding of the rigid and flexible layers.

***Allowable Subject Matter***

9. Claims 44 and 45 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 44, a rigid flex printed circuit board system with the limitation "said at least one rigid layer comprises at least one second structural weakness at at least one second selected location; said at least one second structural weakness is adapted to facilitate breaking said at least one rigid layer at such at least one second selected location into at least two second rigid pieces to provide at least one second flexible connection formed by said at least one second flexible layer between such second rigid pieces," in combination with other claimed limitations of the base claim 1 has not been disclosed or fairly suggested by the prior art of record.

Claim 45 depends upon claim 44 and is allowable for the same reason.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Klosowiak (US Patent No. 5,434,362) in figure 1 and 2 discloses a rigid flex printed circuit board with score line (24, 25) and adhesive (23) for bonding flexible and rigid layers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on (571) 272 1984. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ibp  
September 30, 2007

  
Ishwar (I. B.) Patel  
Primary Examiner  
Art Unit: 2841